

论文

一种研究 A_n 型缩聚反应体系的新方法

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摘要:

应用统计力学基本原理, 从两种不同角度构造了 A_n 型缩聚反应的正则配分函数, 得到了体系的平衡自由能以及质量作用定律的解析表达式, 提出了获得数量分布函数的两种新方法. 进一步基于数量分布函数的不变性, 给出临界点后溶胶相和凝胶相的平衡自由能, 证明溶胶-凝胶相变是一类几何相变, 而非热力学相变.

关键词: 平衡自由能 质量作用定律 溶胶-凝胶相变

New Theoretical Method for Studying Polycondensation of A_n Type

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Abstract:

The canonical partition functions of polycondensation of A_n type were constructed from two viewpoints by the principle of statistical mechanics, and the explicit expressions of the equilibrium free energy and the law of mass action were obtained. Meanwhile, two new methods were used to derive the number fraction distribution function. Below the critical point of the sol-gel transition, the equilibrium free energy of sol and gel phases were given on the basis of the intrinsic invariant property of the number fraction distribution function. Furthermore, the sol-gel phase transition is shown to be a kind of geometric phase transition rather than thermodynamic phase transition.

Keywords: Equilibrium free energy Law of mass action Sol-gel phase transition

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